

REMARKS

Claims 12, 14-24 and 26 are pending in the subject application. By the instant amendment, claim 12 is amended to more specifically recite the subject matter of the present invention. The amendments made to claim 12 introduce no new subject matter as the subject matter thereof may be found in the specification and figures as originally filed.

Claims 12, 14-24 and 26 are submitted to the Examiner for further consideration on the merits. In view of the preceding amendments and following remarks, reconsideration and withdrawal of the rejections of this application are respectfully requested.

A. Introduction

In the Office Action mailed April 9, 2002, the Examiner rejected claims 12, 14-16, 18-22, 24 and 26 under 35 U.S.C. § 103(a) as being unpatentable over United States Patent No. 6,166,423 to Gambino et al. ("the Gambino et al. reference") in view of United States Patent No. Re. 36,786 to Fazan et al. ("the Fazan et al. reference") and United States Patent No. 5,498,889 to Hayden ("the Hayden reference"). The Examiner rejected claim 17 under 35 U.S.C. § 103(a) as being unpatentable over the Gambino et al. reference and the Fazan et al. reference as applied to claims 12 and 14, and further in view of United States Patent No. 6,074,907 to Oh et al. ("the Oh et al. reference"). The Examiner rejected claim 23 under 35 U.S.C. § 103(a) as being unpatentable over the Gambino et al. reference and the Fazan et al. reference as applied to claim 12, and further in view of United States Patent No. 6,066,555 to Nulty et al. ("the Nulty et al. reference").

B. Asserted Rejection Under 35 U.S.C. § 103(a)

In the outstanding Office Action, the Examiner rejected claims 12, 14-16, 18-22, 24 and 26 under 35 U.S.C. § 103(a) as being unpatentable over the Gambino et al. reference in view of the Fazan et al. reference.

The Fazan et al. Reference

While the Fazan et al. reference teaches formation of conductive spacers, the spacers are different from those of the present invention in several ways. The spacers of the Fazan et al. reference are polysilicon; the spacers as recited in claim 12 of the present invention are tungsten containing. The spacers of the Fazan et al. reference are not formed in an interlevel insulating layer; the spacers as recited in claim 12 of the present invention are formed in an interlevel insulating layer. The spacers of the Fazan et al. reference have an oxide 15, in which the conductive spacers are formed, removed from around the spacers, and an HSG silicon layer 31 is deposited on the spacers; the spacers as recited in claim 12 of the present invention do not have the interlevel insulating layer removed from around the spacers, and a dielectric layer is deposited on the spacers. Furthermore, there is no second via hole in the Fazan et al. reference.

The Gambino et al. Reference

The Gambino et al. reference does not teach or mention forming tungsten containing conductive sidewall spacers in an interlevel insulating layer and on a tungsten containing conductive layer formed in a first via hole and on sidewalls of the first via hole for preventing dielectric disconnection, as recited in claim 12 of the present invention. In the rejection, the Examiner states:

It would have been obvious to one of ordinary skill in the art at the time of the present invention to use the etching back of a conductive layer of Fazan to form the conductive spacers in the first via hole of Gambino in order to maximize the area of a capacitor electrode.

Office Action of April 9, 2002, at p. 3.

Because the spacers of the Fazan et al. reference are not formed in an interlevel insulating layer and are covered by HSG silicon, the combination of the Fazan et al. reference and the Gambino et al. reference do not render obvious claim 12 of the present invention, which recites in part:

a tungsten containing conductive sidewall spacer in the interlevel insulating layer and on the tungsten containing conductive layer formed in the first via hole and on sidewalls of the first via hole for preventing dielectric disconnection.

Because neither the Fazan et al. reference nor the Gambino et al. reference teach a tungsten containing conductive spacer, a tungsten containing conductive layer or a tungsten containing conductive plug, the Examiner relies on the Hayden reference for the use of sidewall spacers formed from a tungsten containing material.

The Hayden Reference

The Hayden reference, however, teaches spacers formed of tungsten polycide, e.g., the tungsten is deposited on polysilicon. In claim 12 of the present invention, the tungsten containing conductive spacer in the interlevel insulating layer is not formed on polysilicon, which precludes the tungsten containing conductive spacer of claim 12 of the present invention from being formed of tungsten polycide. As previously noted, the tungsten containing conductive spacer of the present

invention as recited in claim 12 is formed in an interlevel insulating layer, not in a polysilicon layer as taught by the Hayden reference.

Furthermore, the capacitor structure of the Hayden reference is completely different from that of the present invention. The spacers of the Hayden reference are not intended to solve a dielectric layer disconnection problem as in the present invention. In the Hayden reference, the conductive spacer 32 is not formed on top of a predetermined surface of a lower electrode, as recited in claim 12 of the present invention.

Because the spacers of the Hayden reference are formed on polysilicon, and because they are not formed on a lower electrode, unlike the spacers as recited in claim 12 of the present invention, and further because of the differences between the Fazan et al. reference and the Gambino et al. reference, it is submitted that a combination of these three prior art references does not render obvious the present invention as claimed in claim 12.

In view of the differences between the present invention as claimed in claim 12 and the cited prior art references, it is believed that claim 12 of the present invention is patentably distinguished over the cited prior art references, and a notice to such effect is respectfully requested.

Also, because claims 14-16, 18-22, 24 and 26 depend from claim 12, either directly or indirectly, it is believed that claims 14-16, 18-22, 24 and 26 are allowable as depending from an allowable base claim. Therefore, reconsideration and withdrawal of the rejections of claims 14-16, 18-22, 24 and 26 are respectfully requested.

C. Asserted Rejection of Claim 17 under 35 U.S.C. § 103(a)

In the outstanding Office Action, the Examiner rejected claim 17 under 35 U.S.C. § 103(a) as being unpatentable over the Gambino et al. reference and the Fazan et al. reference as applied to claims 12 and 14, and further in view of the Oh et al. reference. Claim 12 is believed to be patentably distinguished over the Fazan et al. reference, the Gambino et al. reference and the Hayden reference. Because the Oh et al. reference does not teach the limitations of claim 12 of the present invention either alone or when combined with the teachings of the other three prior art references, claim 12 is believed to be patentably distinguished over the Oh et al. reference as well. Claim 17 depends from claim 12, which is now believed to be allowable, and therefore claim 17 is believed to be allowable as depending from an allowable base claim. Accordingly, reconsideration and withdrawal of the rejection of claim 17 are respectfully requested.

D. Asserted Rejection of Claim 23 under 35 U.S.C. § 103(a)

In the outstanding Office Action, the Examiner rejected claim 23 under 35 U.S.C. § 103(a) as being unpatentable over the Gambino et al. reference and the Fazan et al. reference as applied to claim 12, and further in view of the Nulty et al. reference. Claim 12 is believed to be patentably distinguished over the Gambino et al. reference, the Fazan et al. reference, the Nulty et al. reference and the combination thereof, because none of the references, either alone or combined, teach each and every limitation of claim 12 of the present invention.

Therefore, since claim 23 depends from claim 12, which is now believed to be allowable, claim 23 is believed to be similarly allowable as depending from an allowable base claim.

Accordingly, reconsideration and withdrawal of the rejection of claim 23 are respectfully requested.

E. Conclusion

Since none of the prior art cited, whether alone or in combination, either anticipates or renders obvious claims 12, 14-24 and 26, it is submitted that these claims are in condition for allowance, and a notice to that effect is respectfully requested.

Finally, if the Examiner believes that additional discussions or information might advance the prosecution of the instant application, the Examiner is invited to contact the undersigned at the telephone number listed below to expedite resolution of any outstanding issues.

In view of the foregoing amendment and remarks, reconsideration of this application is respectfully requested, and an early and favorable action on all of the pending claims is earnestly solicited.

Respectfully submitted,
LEE & STERBA, P.C.

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Eugene M. Lee, Reg. No. 32,039
Richard A. Sterba, Reg. No. 43,162

LEE & STERBA, P.C.
1101 WILSON BOULEVARD, SUITE 2000
ARLINGTON, VA 22209
703.525.0978 TEL
703.525.4265 FAX